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NOTES ON AFRICAN MYRMELEONIDÆ.

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The following article is based largely on the collection of African Myrmeleonidæ of the Berlin Museum, which the curator, Dr. R. Heymons, wished me to work out for them. Mr. Esben Petersen has kindly loaned me his collection of Abyssinian Myrmeleonidæ, which contains several species previously unknown to me. My own collection contains a number of species, principally from South Africa from Dr. H. Brauns' duplicates from the Petersen collection, and material purchased from dealers.

There are many other species recorded from Africa. Some of these are probably synonyms of well-known species. I have made a new arrangement of the genera, and given tables to species as far as possible.

Much of the Berlin Museum material is from German East Africa (D. O. Afrika), but many valuable specimens are from German Southwest Africa (D. S. W. Afrika), from Kamerun and Togoland.

The types of the new species, except where otherwise indicated are in the Berlin Museum.

TABLE OF GENERA OF AFRICAN MYRMELEONIDÆ.

- | | |
|---|----------|
| 1. In the hind wings but one (rarely two) cross-veins before the origin of the radial sector; the anal usually ends in the margin (Dendroleoninæ)..... | 11 |
| In the hind wings four or more cross-veins before the origin of the radial sector; the anal often runs into the cubital fork (Myrmeleoninæ)..... | 2 |
| 2. In the hind wings the anal is not connected directly to the hind margin by cross-veins, but to the post-anal by a series of cross veins; wings heavily marked; pronotum very much broader than long (Palparini)..... | 3 |
| In hind-wings the anal vein is connected directly to the hind-margin by several cross-veins (Myrmeleonini) | 6 |
| 3. Two or more series of costal cells nearly to the base of wing..... | Stenares |
| But one series of costals, except near the stigma..... | 4 |
| 4. Apex of subcosta incrassate..... | Pamexis |
| Apex of subcosta not incrassate..... | 5 |

5. Antennæ not their diameter apart at base; the basal joint with long bristles
Palpares
 Antennæ more than diameter of basal joint apart; smaller species. *Tomatares*
6. Spurs longer than the basal joint of tarsus, which is very short. 7
 Spurs not longer than the basal joint of tarsus, which is longer than the second joint. 9
7. Body very hairy; legs very short; spurs much curved. 8
 Body but little hairy; legs more slender; spurs nearly straight; a line through the apical part of wings. *Myrmecælorus*
8. Costal series double. *Syngenes*
 Costal series single. *Acanthaclisis*
9. The branches of radial sector are bent to form a straight line through the middle of the apical part of the wing; basal joint of the tarsus about as long as the apical. *Nesoleon*
 No such line through the wings. 10
10. In fore wings the radial sector arises before the cubital fork; many costals before the stigma are crossed. *Hagenomyia*
 In fore-wings the radial sector arises much beyond the cubital fork; costals are mostly simple. *Myrmeleon*
 (a) A series of cross-veins before the radial sector are crossed; very large species. subgenus *Macroleon*
11. Spurs present and distinct. 12
 No spurs:
 Legs very slender. *Gymnocnemia*
 Legs of usual length. *Gymnoleon*
12. The forks of cubitus in the fore-wing are parallel for a distance, and the anal is also parallel to them. *Creagriss*
 The forks of cubitus diverge, and the anal is not parallel to the upper branch, and to the lower only for a short distance. 13
13. Joints 2, 3, and 4 of tarsus very long, each as long as basal joint. *Megistopus*
 Joints 2 and 3 very short, but little longer than broad. 14
14. Legs very slender; the tibiæ I and II as long or longer than femora I and II; basal tarsal joint nearly as long as apical; spurs as long as two joints; antennæ very slender; wings broad and much marked (*Dendroleoni*). 15
 Legs shorter; the tibiæ I and II shorter than femora I and II, the basal tarsal joint plainly shorter than the apical (*Nemoleonini*). 16
15. Wings especially hind pair very strongly falcate at tip; first joint of tarsus longer than the last. *Cymothales*
 Wings hardly falcate; the branches of radial sector bent to form a straight line through the middle of apical half of wings. *Dendroleon*
16. In hind-wings the anal does not run directly to the margin but bends upward making a long curve; the radial sector arises before cubital fork in both wings. *Echthromyrmex*
 In hind-wing the anal runs directly to the hind margin. 17
17. Spurs but little longer than the long first joint of tarsus; first branch of radial sector arises beyond end of the anal vein. *Nemoleon*
 Spurs longer than the first tarsal joint, which is short. 18
18. Spurs as long as three or four joints of tarsus. *Formicaleon*
 Spurs not so long, about as long as two tarsal joints. *Macronemurus*

Under *Stenares* I have placed *Crambomorphus*. Both are hardly more than subgenera of *Palpares*. *Symmalthetes* is united with *Palpares*. A species of *Glenurus* is described from Africa, but from the figure it is a *Dendroleon*; the genus *Palparidius*, lately described by Peringuey, appears to be identical with *Echthromyrmex*. The *Centroclisis* of Navas I consider the same as *Acanthaclisis*.

Palpares Rambur.

Of this genus there are about forty named species from Africa; doubtless there are several more. They are the grandest and most beautiful insects of the family, if not of the entire Neuropteroid series. Their marking are however, variable, as may be easily seen from even a small series of specimens.

I have tabulated thirty-four of the species, but a few are perhaps synonyms.

Type—*P. libelluloides*.

SYNOPSIS OF SPECIES.

1. Hind-wings black, except seven or eight small spots..... 2
Hind-wings much more pale, only with dark bands..... 3
2. Hind-wings very narrow, lanceolate.....*karrooanus*
Hind-wings broad, not lanceolate.....*voeltzkowi*
3. Fore-wings with a complete band across before middle..... 4
Fore-wings without complete band before middle, outer margin of wings scarcely sinuate..... 6
4. Outer margin of wings sinuate; very large species (*Symmathetes*)..... 5
Outer margin of wings not sinuate, rather small species.....*ovampoanus*
5. Basal band of fore-wings reaches hind margin, apical spot divided; hind-wings with the stigmal spot furcate in front, apical spot divided.....*gigas*
Basal band of fore-wings does not reach hind margin, apical spot not divided; hind-wings with the stigmal spot not furcate in front, apical spot not divided, but emarginate.....*mœstus*
6. A large dark spot over the cubitus in the hind wings.....21
Not more than a dot over the forking of cubitus, although a dark spot may be near by..... 7
7. Hind wings with complete bands..... 8
Hind wings without complete bands..... 13
8. Fore-wings densely reticulate with black, but leaving three clear yellow bands.....*flavofaciatus* and *genialis*
Fore-wings without three clear yellow bands..... 9
9. Median band with a projection toward the cubital fork, or else a separated spot near by, the stigmal band with an upward projection as well as one behind.....10
Not so marked..... 11
10. Median band of hind-wings connected to the stigmal, and median has a projection toward cubital fork.....*latipennis*
Median band well separated from stigmal, and a spot near cubital fork separate from the median band.....*inclemens*
11. Median and stigmal bands of hind wings well separated.....*insularis*
Median and stigmal bands connected or nearly so..... 12
12. Apical spots of both wings divided so as to form an anterior and posterior apical streaks.....*elegantulus*
Apical spots not so divided.....*amitinus*
13. Wings with all small spots, no large ones; legs yellow.....*sparsus*
Wings with some large spots..... 14
14. Outer margin of both wings very narrowly black; no marks between median and stigmal spots in fore-wings..... 15
Outer margin of wings with dots or spots; some marks between median and stigmal spots in the fore-wings..... 16
15. A black band below antennæ.....*ægrotus* (*tessellatus*)
No black band below antennæ.....*tigris*
16. Median spot of hind-wings not reaching one-half way across wing; in fore-wings the median and stigmal spots are small..... 17
Median spot of hind-wings reaches one-half way across wing..... 18

17. Legs yellowish; few small spots in fore-wings; (female)..... *submaculatus*
 Legs blackish, more small spots in fore-wings, (male, probably same as
submaculatus)..... *nyicanus*
18. In fore-wings the median spot is barely larger than the numerous other spots.
pardaloides
 In fore-wings the median spot is much larger than the many small spots.... 19
19. Many small spots in the basal part of the hind-wings..... *furfuraceus*
 Few, if any, small spots in the basal part of the hind wings..... 20
20. Larger; spots not broken up much..... *tristis*
 Smaller, wings shorter, and appendages shorter, stigmal spot of hind-wings
 more broken up..... *interioris*
21. Basal spot of hind-wings reaches nearly to base of wings..... 22
 Basal spot of hind-wings not reaching toward base..... 23
22. Basal spot large and angulate, also large stigmal spot..... *immensus*
 Basal spot in form of a streak, also other streaks..... *radiatus*
23. Median band of fore-wings very small, reticulate, with darker edges, fore-
 wings often yellowish..... 24
 Median band of fore-wings distinct, reaching one-half way across wing.... 27
24. Median and stigmal spots of hind-wings connected; but few small spots in
 the fore-wings..... *stuhlmanni*
 Median and stigmal spots not connected, more small spots in the fore-wings.
 25
25. Hind part of fore-wings not tessellate with dark spots..... *dubiosus*
 Hind part of fore-wing tessellate with dark spots..... 26
26. Fore-wings not very yellowish..... *speciosus*
 Fore-wings plainly yellowish..... *caffer*
27. Median band of hind-wings bent inward behind; stigmal spot broader behind
 than in front, and reaches hind margin..... 28
 Median band not bent inward at tip; stigmal spot not reaching hind margin
 and narrow behind..... 32
28. Wings broad; median band of hind-wings does not reach the hind margin.
hispanus
 Wings usually narrow, median band of hind-wings reaches hind-margin. . . 29
29. Apical mark of hind wings connected to the stigmal..... 30
 Apical mark of hind-wings not connected to stigmal; two yellowish spots on
 front of the pronotum..... 31
30. But lightly marked, stigmal spot of fore-wings larger, from Madagascar...
martini
 More heavily marked, stigmal spot smaller; from South Africa (may be same)
cataractae
31. No small spots between median and stigmal spots in fore-wings.... *damarensis*
 Many small spots between median and stigmal spots in the fore-wings....
formosus
32. Stigmal spot of hind-wings connected to a large spot just before it... *cephalotes*
 Stigmal spot of hind-wings without a spot just before it..... 33
33. Stigmal spot of hind wings reaches across wing, in fore-wings nearly across;
 median spot of fore-wings very narrow..... *percheroni*
 Stigmal spot of hind-wings and fore-wings not near across wing... *libelluloides*

***Palpares formosus* n. sp.**

Head black, clypeus yellow; pronotum black, with two yellow spots in front; rest of the thorax black, with several pale spots through the middle; legs black; abdomen pale, darker toward tip. Wings very slender; forewings densely spotted with small brown dots, but a narrow angulate median band crosses the wing, the stigmal spots small, and a rather large preapical spot. Hindwings with a large spot over the fork of the cubitus, an angulate median band crosses the wing to the hind margin, leaving two small hyaline spots on the hind margin; a stigmal band crosses the wing, leaving one hyaline spot on the hind margin,

and it has an inner projection toward the median band; a transverse, preapical band, connected each side around the tip and thus enclosing a hyaline spot.

Expanse 80 mm.

From Willowmore, Cape Colony, 20 Febr. (Dr. Brauns). Similar to *P. damarensis* McLach., but with more slender wings; the forepair with spots all over the surface, not clear between the median and stigmal bands. (Banks coll.)

Acanthaclisis Rambur.

This genus is related to *Myrmeleon*, but distinguished by the very heavy legs, and the much curved or rather geniculate spurs; the body and legs are extremely hairy; the antennæ are rather close together at base; the wings in most forms have a line through the apical part of the wings formed by the bending of the branches of the radial sector, and there is a similar line through the cubital area formed by the bending of the branches of the upper cubitus.

Type—*A. occitanica*.

The genus *Syngenes* formed for *A. debilis* Gerst, is scarcely more than a subgenus; it has many of the costal crossveins crossed.* The genus *Centroclisis* is, I think, a synonym of *Acanthaclisis*, its type species agreeing closely with my specimens of *A. distincta*.

Quite a number of species have been described from Africa; Dr. Van der Weele examined Gerstaecker's types and placed most of them as synonyms of other forms; I have seen only a few of the species, and the following table is based partly on the descriptions.

1. Costal area with many of cross veins crossed (<i>Syngenes</i>).....	<i>longicornis</i>
Costal area with most of cross-veins simple or forked.....	2
2. A black streak through middle of fore-wings.....	<i>lineatipennis</i>
No black streak in fore-wings.....	3
3. Spurs evenly curved.....	<i>dasyrilla</i>
Spurs geniculate.....	4
4. Fork of cubitus with a distinct spot.....	<i>mashunensis</i>
Fork of cubitus unmarked.....	5
5. Various patches of white cross-veins in both wings; many small dark dots; larger ones along upper edge of cubitus, especially at end.....	<i>gulo</i>
Few patches of white cross-veins; less marked with dark, wings rather more acute at tips.....	6
6.—Costal series almost all simple; pronotum not so plainly lineate with black..	<i>distincta</i>
Costal series mostly forked; pronotum very distinctly lineate with black..	<i>baetica</i>

**A. americana*, *A. fallax* have many costals forked; *A. japonica*, *A. horrida*, and some Australian species have many costals crossed.

Acanthaclisis bætica Rambur.

Not before recorded from Africa; in the Petersen coll. a specimen from Oran, Algeria agrees with Spanish specimens.

Myrmecælurus Costa.

This genus is related most closely to *Nesoleon*, but separated from that as well as from *Myrmeleon* by the longer spurs; there is a line through the apical part of the wing.

There are several species recorded from Africa, but I have seen but one which is new. The *Myrmeleon tristis* has been referred to this genus, but is nearer to *Myrmeleon*, and is better placed in a new genus.

Type—*M. flavus* (= *trigrammus*).

Myrmecælurus subcostatus n. sp.

Pale yellow; no mark between antennæ, and only very faintly on each side on the anterior part of vertex; antennæ pale brownish; pronotum with a black line each side not reaching either margin, and a median black dot on front margin; three black lines on rest of thorax, the median one nearly complete (single on the scutelli), the lateral ones interrupted, some dark lines over base of coxæ I and II; abdomen with a dark median stripe from base to tip, and a dark stripe each side on the venter. Wings hyaline, venation yellowish, the subcosta very strongly marked with black nearly to the stigma; the black extending up on each costal crossvein; the radial sector much marked with black, and at tip with a black streak extending out over the end of radius toward the tip of wing; some dark dots on origin of branches of cubitus, and a few others near middle of wing. In the hind-wings the subcosta and radius are marked near base, and to a lesser degree on the radial sector and cubitus, and a few veins near middle of wing. Pronotum much broader than long, rounded in front. Wings rather broad near tip; about seven or eight crossveins before radial sector, and about ten branches to the radial sector; costals simple; hind-wings a little narrower but scarcely more acute than the fore-wings.

Expanse 58 mm.

From *Erythraea* (Kristensen coll.); types in coll. Banks and Petersen.

Nesoleon Banks.

This genus is near *Myrmeleon*, having several crossveins before origin of the radial fork in hind wings, but a single costal series, and the spurs no longer than basal tarsal joint. There are from 6 to 10 crossveins before radial sector (more than in *Myrmeleon*, and the spurs or one of them is much shorter than the basal tarsal joint, which is nearly as long as the apical joint; the antennæ are wide apart at base. The wings are broad and

subfalcate at tip, and differ at once from *Myrmeleon* in having a line through the apical part of each wing, partly formed by the bent branches of the radial sector.

Type—*N. braunsi* Bks.

1. Wings with large black spots. 2
Wings with only small black marks. 3
2. Wings almost all black, more than apical half of hind-wings black, only the stigma and an apical spot pale. **braunsi**
Wings mostly pale, less than apical half of hind-wings black, large stigmal and apical spots pale. **boschimanus**
3. No interantennal mark. 4
Interantennal mark distinct. 5
4. Pronotum with three dark stripes (unnamed species from Kamerun, but one specimen) sp.
5. Pronotal stripes slender and broken; wings rather narrow; a dark spot at the base of the stigma, one at end of the cubital fork, and one over cubitus and median near their ends; elsewhere but little marked. **trivirgatus**
Pronotal stripes plain and complete. 6
6. Wings rather evenly marked all over with small blackish spots at the forks of the veins; the outer gradates not more prominent than other veins, nor a mark at the end of the cubital fork. **punctatissimus**
Wings not evenly marked all over. 7
7. Wings almost all hyaline, only faintly marked and then most noticeable near the outer apical margin; stigma darker at base. **pallens**
Wings unevenly marked, the stigma with a prominent dark spot at base, the outer gradates marked, and a pale unmarked streak beyond it, no prominent spot at end of cubital fork. **mysteriosus**
Similar to *N. mysteriosus*, but the wings not much marked, except at the gradate series, and near the end of the anal vein, thus two oblique lines on each fore-wing; stigma dark at base; longitudinal veins of wings strongly marked. **variegatus**

Nesoleon braunsi Banks.

I have seen only the types from Willowmore, Cape Colony, (Dr. Brauns).

Nesoleon boschimanus (Peringuey).

Head black; a large pale spot each side on face; vertex pale, with black dots, three in each of three rows, median spots sometimes connected; pronotum with broad median black, and two narrower stripes each side, the median continued back over the thorax, and the lateral also continued, but in a broken and branched form; abdomen black, some of the segments beyond middle are pale at tip; femora brown; tibiæ pale, with a black tip, and on front and middle pair a median band also; tarsi, except basal joint, mostly black; spurs weak, hardly more than one-half the length of the basal tarsal joint. Wings moderately broad, about as in *N. mysteriosus*; apex acute; venation interrupted black and white; forewings with larger spots along hind and outer margin, a sub-basal spot, a larger oblique median spot, a larger stigmal spot, sloping inward, a spot behind this one; hind wings pale on basal three-fifths; two small spots near disc of wing, then a broad prestigmal band, narrowed in the middle, and broadened behind and reaching outward to near tip of wing, a prominent spot beyond the stigma, nearly

connected to the large black spot behind it. Seven cross-veins before radial sector in hind wings; eight branches to radial sector in both pairs; abdomen shorter than wings.

Expanse 40-45 mm.

From Deutsch Sud. W. Afrika; Grootfontein, Okahandya, and Gr. Namalaut.

Nesoleon mysteriosus (Gerst.).

From various places in D. O. Afrika (Berlin Museum); and Mt. Altego, Uganda (Banks coll.)

Nesoleon variegatus (Klug).

From Harrar, Abyssinia (Petersen and Banks coll.)

Nesoleon trivirgatus (Gerst.)

From Grootfontein, D. S. W. Afrika. This may be but a pale form of *N. variegatus*.

Nesoleon punctatissimus (Gerst.)

From Windhoek, Reitfontein and Reheboth, D. S. W., Afrika, and Lindi, D. O. Afrika. This may be the *Myrmeleon lanceolatus* Ramb.

Nesoleon pallens. (Klug).

Several specimens collected by Kristensen in Erythræa I believe are this species; there is some variation in length and breadth of wing and one specimen has the wings about as Klug figures, but the abdomen does not show the transverse dark marks, nor does Klug's description mention them, so I presume the figure is too highly colored in this respect. Klug's species is surely a *Nesoleon* as he shows plainly in his figure the fine line in the apical venation of the forewings.

Hagenomyia new genus.

This genus agrees in general with *Myrmeleon*; there are several crossveins before the radial sector in the hind wings; the spurs are no longer than the first tarsal joint; which is longer than the second; the antennæ are wide apart at base; and there is no line through the apical part of the wings; it differs from *Myrmeleon* in the much broader wings, in having the radial sector of forewings arising before the cubital fork, and in having many costals before the stigma crossed.

Type—*Myrmeleon tristis* Hagen.

Hagenomyia tristis (Hagen).

This is very common in many parts of Africa; I have seen specimens from Argabba, Tewe, N. Usambara, Kamerun, Togo, Kongo, Tanganjika, Sansibar, Angola, Madagascar, and various places in D. O. Afrika (Berlin Museum), Erythraea, Abyssinia, and Abutshi, Niger (Banks coll.)

Myrmeleon Linnaeus.

In this genus there are several crossveins before the radial sector in both wings, the anal is connected to margin; there is no straight line through the apical part of the wings, the basal joint of tarsus is much shorter than the apical joint and the spurs are not or but a little longer than the basal joint; the costals are simple, the cubital forks diverge, and the wings are usually narrow.

Type.—*Myrmeleon formicarium* Linn.

There are two subgenera; *Myrmeleon* and *Macroleon*, the latter with large species, mostly broader wings, and with several of the crossveins before the radial sector crossed; the type of this subgenus is *M. (Myrmeleon) validus* McLach.

Many species have been described from Africa, several of which probably do not belong to the genus as here restricted, and others are perhaps synonyms of some of the common species. Those that I have seen are tabulated below.

- | | |
|---|------------------|
| 1. Fore-wings with an oblique dark mark up from the end of the anal vein, and dark spots on the cubitus and median near the tip; pronotum dark..... | alcestris |
| No such marks..... | 2 |
| 2. Outer apical margin of both wings narrowly dark; pronotum dark..... | formicaroides |
| Outer apical margins not dark..... | 3 |
| 3. A large dark cloud before and beyond the large white stigma..... | lynceus |
| No such cloud..... | 4 |
| 4. Abdomen plainly banded with pale; pronotum dark, indistinctly marked.. | 6 |
| Abdomen not plainly banded with pale; pronotum pale yellowish, at least on sides..... | 5 |
| 5. A simple, narrow median dark stripe on the pronotum..... | medialis |
| A simple median, and a lateral stripe for most of the distance on pronotum.. | doralice |
| A broad median stripe furcate in front on the pronotum..... | furcatus |
| A broad median dark stripe on pronotum, serrate on the sides and occupying most of the surface..... | lethifer |
| 6. Size small, stigma barely distinct; no series of crossed veins before radial sector in fore-wings, cubitus marked with black and white..... | obscurus |
| Size very large, stigma plainly white; a series of crossed veins before radial sector in fore-wings (Macroleon)..... | 7 |
| 7. Wing tinged throughout with a vinous color..... | validus |
| Wings not tinged with vinous..... | 8 |
| 8. Interantennal mark includes a pale spot below antennæ; black on clypeus; pronotum with five pale spots..... | quinquemaculatus |
| Interantennal mark not complete below, but with a deep median indentation of pale; hardly black on clypeus; larger and with narrower wings..... | atlas |

***Myrmeleon obscurus* Rambur.**

Widely distributed in tropical and South Africa. Specimens have been examined from Harrar, Abyssinia (Petersen coll.); Tamatave and Vohemar, Madagascar, (Banks coll.) and Erythræa; from Bagamoyo and Lindi, D. O. Afrika, Windhoek, D. S. W. Afrika, Livingstone, S. Afrika, and Kamerum (Berlin Mus.).

***Myrmeleon lethifer* Walker.**

From White River, Transvaal, Kibwezi, Brit. O. Afrika, and Kwidjwi, Ost Afrika. *M. nigradorsis* Kolbe is the same species.

***Myrmeleon doralice* n. sp.**

Face yellow, a large shining black interantennal mark, curving evenly downward on the face, and above reaching to middle of vertex, with a median extension on vertex, and a black streak each side; antennæ rather long, blackish, tip paler, pronotum longer than broad, narrowed in front, pale yellow, a median black stripe, widest in front, and a curved black streak each side from behind the transverse furrow; rest of thorax with middle black spot, and oblong spots over the base of wings, a basal median black spot on the scutelli; pleura black through the middle; abdomen shorter than wings, black, tips of segments narrowly pale, sides pale; legs pale yellowish, tips of tibiæ rather darker, tip of last tarsal joint black; spurs not as long as basal tarsal joint, which is much shorter than the apical joint. Wings hyaline; venation pale yellowish, subcosta, radius, and cubitus marked with dark, stigma hardly distinct. Wings rather slender, acute at tips; about 10 cross-veins in forewings before radial sector, 6 in hind wings, 10 branches of radial sector; in the forewings the first fork of radial sector is so connected up to the radius as to appear as a distinct sector of the radius, thus apparently two radial sectors.

Expanse 60 mm.

From Windhoek, D. S. W. Afrika.

***Myrmeleon alcestris* n. sp.**

Head mostly black, margin of face yellow, a median yellow spot on the clypeus, two dots between the antennæ, and the orbits yellowish; a pale stripe across vertex in front, a large yellow spot each side, and three longitudinal submedian lines on the vertex pale, a spot each side on occiput pale; basal joints of antennæ pale, with dark rings, rest dark brown; pronotum short, a median dark streak, a spot near each anterior corner, and a larger spot in each hind corner, dark; rest of thorax dark, with indistinct black marks, and the hind margins of the segments pale; coxæ black, femora black, except pale base, tibiæ pale, heavily spotted or streaked with dark; tarsi pale brownish, tip of last joint black; spurs not as long as basal tarsal joint, which is about two thirds as long as the

apical joint. Wings hyaline; venation black and white, the crossveins with black dots, the longitudinal veins with longer black streaks, a black spot at the base of the stigma, an oblique blackish cloud up from the end of the anal vein, and a spot over cubitus and median at the usual point for such spot. Wings slender, acute at tips; 7 cross-veins before radial sector in forewings, 5 in hind wings; 10 branches of radial sector in both pairs.

Expanse 54 mm.

From Reitfontein, D. S. W. Afrika.

Myrmeleon medialis n. sp.

Head with a large black interantennal mark reaching down over most of the face and up to the vertex, a dark mark on clypeus, in middle connected upward to the interantennal mark; vertex with a double median spot in front, a small median one behind, and a long one each side, black; antennæ dark brown, short; pronotum but little longer than wide, pale, with a broad median brown stripe; thorax pale, with some large median black spots, and one over base of each wing, pleura with a broad broken black streak; abdomen black, with short white hairs, not as long as wings; legs pale, rather more brownish toward tips, with black bristles, tarsi quite long, first joint hardly as long as second and third together, fifth one and a half times as long as the first, spurs not as long as the first joint. Wings hyaline, venation pale yellowish, subcosta slightly marked with black, stigma barely distinct. Wings long and slender, forewings sub-falcate at tip, about 9 crossveins before radial sector in forewings, and 6 in hindwings; 10 branches of radial sector in both wings.

Expanse 60-68 mm.

From Natal and Georgetown, Cape Colony.

Myrmeleon furcatus n. sp.

Head pale yellow, a black mark at base of each antennæ, and a median vertical line; a broad, dark band above antennæ; vertex with a pair of broken submedian stripes, a broader short stripe each side behind, with lateral projections toward eyes, and a lateral spot in front; antennæ with a brown mark on basal joint; a narrow brown ring on second joint, beyond that brown; pronotum pale, with a broad median dark stripe, furcate in front; a short dark stripe on each hind corner; rest of thorax dark, with hind margin of meso- and meta-thorax pale, a narrow pale line on each lateral lobe of the mesothorax, a spot on each lateral lobe of the metathorax, and the scutelli with a pale dot each side, and sometimes other spots; abdomen dark, pale at tip; legs pale, a dark line on the tibiæ, and a streak near tip of femora; spurs as long as the first tarsal joint, which is not as long as the next three together, and shorter than the last joint. Wings hyaline; venation pale, subcosta, radius and cubitus interrupted with dark, also slightly on the radial sector, stigma dark, with a darker spot at base. Wings long, acute at

tips, the hind pair almost subfalcate at tip; about eleven crossveins before the radial sector in forewings, six in hind wings; about twelve branches to radial sector in each wing.

Expanse 73 to 90 mm.

From *Erythræa* (Kristensen coll.). Types in collections of Banks and Petersen.

***Myrmeleon lynceus* Fabr.**

From Victoria, Kamerun, and a smaller specimen from Togo. The *M. leucostigmatus* Weele, from Kamerun, is a synonym.

***Myrmeleon formicaroides* Weele.**

One specimen from Misahohe, Togo.

***Myrmeleon quinquemaculatus* Hagen.**

A common African species, specimens from Ginda (Petersen coll.), Kilimandjaro (Banks coll.) and various places in Togo and D. O. Afrika. *M. polyzones* Gerst. and *M. rapax* Kolbe are synonyms as already stated by Van der Weele.

***Myrmeleon validus* McLachlan.**

From Tamatave, Madagascar (Banks coll.).

***Myrmeleon atlas* n. sp.**

Similar to *M. 5-maculatus*, but much larger. Face yellow, with a median black spot below, the interantennal mark is not complete below, but indented with the pale reaching up between antennæ, and the mark is not continued all around the lower edge of the antennal socket; marks of vertex similar to those of *M. 5-maculatus*; the pronotum shows a large pale median spot in front, and at each upper corner, with a narrow extension backward; the abdominal segments are pale only near middle (not to base as in *5-maculatus*); the legs yellowish brown, not plainly marked. Wings much more slender than in *M. 5-maculatus*, especially the hind pair, and more falcate at tip; venation mostly dark, subcosta and radius plainly interrupted with pale; stigma not very distinct; there is a longer series of crossed veinlets before the radial sector in forewings than in *M. 5-maculatus*.

Expanse 126 mm.

From Kwidjwi, Ost Afrika.

***Gymnoleon* new genus.**

But one crossvein before radial sector in the hindwings, several in forewings; costal series simple, cubital forks not very much divergent; antennæ rather close together at base; pronotum slender; no spurs; legs of moderate length, the last joint of tarsus as long as the basal joint.

Type—*G. exilis* n. sp.

By absence of spurs it is related to the genus *Gymnocnemis*, but differs at once in the very much shorter and stouter legs.

Gymnoleon exilis n. sp.

Face pale yellow, a large black interantennal mark, a row of spots across the vertex, the middle one the largest; pronotum pale yellowish, a pair of black submedian stripes, not quite parallel, and a lateral stripe each side; rest of thorax pale, with a pair of dark submedian lines, broken, but extending over the scutelli, a lateral dark line over base of wings; abdomen rather pale, with dark stripe on each upper side; legs pale, middle and apical mark on tibiæ, except the hind tibiæ have only the apical mark, tips of tarsal joints black. Wings hyaline, venation mostly brown, but the longitudinal veins are interrupted with pale, many of the cross-veins with a pale dot or space; many of the forks in posterior and outer part of fore-wings have a black dot, a larger spot near end of anal vein, and faintly dark at anastomosis of cubitus and median, this last mark is more prominent in the hind-wings, often elongate. Wings rather slender, acute at tips, the hind pair plainly longer than the forewings, narrower and subfalcate at tips; about seven crossveins before radial sector in forewings, about 8 branches of radial sector in each wing, in forewings the anal vein ends before the origin of first branch of radial sector, and the forks of cubitus are plainly divergent. The pronotum is longer than broad, and broadest behind; the abdomen is much shorter than the wings.

Expanse 45 mm.

From Ari Ugri, Erythræa (Kristensen coll.) and from Lindi, D. O. Africa (Berlin Mus.). Type in coll. Banks; cotypes in coll. Petersen and in Berlin Museum.

Gymnoleon elizabethæ n. sp.

Face yellow, a black band below the antennæ reaching above them, the vertex broadly rounded in front and dark brown, back of vertex gray, with two rows of blackish dots, front of vertex with a median furrow making the front plainly bilobed; antennæ brown, tip paler, pronotum short, dull blackish, a faint paler spot each side in front, and one or two in the middle; thorax brown, indistinctly marked with pale; a deep black band on metanotum; abdomen blackish; legs short, yellow-brown, with black marks on tibiæ, hind tibia only at tip, tarsi mostly dark brown, except the basal joint of hind tarsus which is yellow; no spurs; basal joint of tarsus as long as second and third together. Wings with black and white venation, on radius the black and white are in long streaks, elsewhere in short spots, along cubitus and its fork are several small clouds of brown, and a longer oblique mark on cubitus and median near their tip, stigma dark at base, and a cloud near end of anal and cubital fork. Wings slender, subfalcate at tips, anal and cubital fork in forewings run parallel for a distance longer than width of wing, the cubital fork nearly parallel to the cubitus; twelve branches of radial sector in each wing; in apical part of wings the longitudinal veins are very close together.

Expanse 52 mm.

From Port Elizabeth, Cape Colony, 25 Jan., (Brauns), (coll. Banks).

Creagris Hagen.

This genus is known by the parallel forks of the cubitus in the anterior wings; there are but two rows of cells between the forks and these are separated by a nearly straight vein; the anal vein also runs parallel to the cubital forks for some distance.

Type—*C. plumbeus* Oliv.

Many species are known by the names, but several of these names apply to variations of *C. plumbeus*. Whether these forms should be kept distinct or all united under the one name must be determined by larger collections from representative parts of Africa.

The forms I have examined are distinguished as follows:

- | | |
|---|-----------------------|
| 1. Venation pale, unmarked..... | 2 |
| Venation marked with black and white..... | 5 |
| 2. Apex of hind-wings with a fuscous streak..... | 3 |
| Apex of hind wings unmarked..... | 4 |
| 3. Very large species..... | <i>diana</i> |
| Species of moderate size..... | <i>nubifer</i> |
| 4. Pronotum with indications of two narrow submedian lines; femora dotted with black..... | <i>murinus</i> |
| Pronotum with a median stripe or absent; femora scarcely dotted with black..... | <i>africanus</i> |
| 5. Wings with black longitudinal streaks..... | <i>nigrostrigatus</i> |
| Wings without streaks..... | 6 |
| 6. Four large black spots along the radial sector in the fore-wings.... | <i>pretiosa</i> |
| No such large spots..... | 7 |
| 7. No black band below antennæ..... | 8 |
| A black band below antennæ, vertex with a frontal ridge, venation strongly marked with black and white..... | <i>aegyptiacus</i> |
| 8. An oblique dark mark at end of anal vein in fore-wings; venation very plainly marked with black and white..... | <i>mortifer</i> |
| No marks on wings; venation only faintly marked with dark and pale.... | <i>plumbeus</i> |

Creagris pretiosa n. sp.

Face pale, a median vertical black line, and a brown spot under each antenna; antennæ brown, base yellowish; vertex with a black band in front, a row of connected black dots, and behind arc six separated black dots, the submedian ones being longitudinal; pronotum gray, black on the sides and a submedian pair of black stripes, broadest in front; thorax gray, black marks on the lateral lobes and the usual black band on the mesonotum; abdomen black above, pale beneath. Legs brown, with much gray hair, femur I black on inner tip, tibia I black in middle and near tip, middle leg similar, hind legs paler, the tibiæ black only at tip, all tarsi black, except yellow on basal and most of apical joint of tarsus I. Wings hyaline, venation black, interrupted with pale, the cross-veins mostly wholly black; four large black spots along the radial sector of forewings, another smaller at base of the stigma, a black streak along base of the cubital vein, small black spots at forking of cubitus and farther out on cubitus, one on a crossvein connecting median to the first branch of the radial sector, and one at

end of the anal vein, the outer gradate veins form a black line parallel to the outer margin; hindwings with a black spot at the base of the stigma one on a crossvein below and a little before it, and two faint ones on other crossveins from radial sector to radius, another near the end of the cubitus. Forewings broad, acute at tip, almost falcate, the costal margin at base plainly concave, the anal runs parallel to the fork of cubitus for much less than the width of the wings. Hind wings narrow, subfalcate at tip; eleven branches of radial sector in both pairs.

Expanse 78 mm.

From Deutsch Ost Afrika, Bex Lindi. (Berlin Museum).

Creagris diana Kolbc.

Of this magnificent species there are specimens from Lindi, and Mohorovi, D. O. Afrika. Peringuey's recent species, *C. inclitus*, seems to be the same form; his description agrees with the East African specimens.

Creagris nubifer Kolbc.

Specimens from Lindi, D. O. Afrika; Bismarcksburg, Togo, and from Harrar, Abyssinia (Petersen coll.). Peringuey's recent *C. proximus* from South Africa agrees with these specimens.

Creagris plumbeus (Oliv.)

Specimens from Morocco, agree with the European form; they have a median dark stripe on the pronotum, and the longitudinal veins are faintly marked with dark. Also known from Algeria.

Creagris murinus (Klug).

Egypt (Petersen coll.). The median marks on the pronotum are in form of two approximate dark lines; the venation is wholly yellowish. On Klug's plates it is figured as *M. syriacus*, but in text described as *M. murinus*.

Creagris africanus (Rambur).

From D. O. Afrika, Sansibar, Victoria Nyanza, and D. S. W. Afrika (Outyo). The legs are less marked than in *C. murinus*, the median stripe on the pronotum is often absent, and the wings are plainly more acuminate at tips than in *C. murinus*. Peringuey's species, *C. pseudoplumbeus* from South Africa seems to be the same species. It is probable that this and *C. murinus* are but varieties of *C. plumbeus*; *C. luteipennis*, *C. lanceolatus* Rbr., and *C. lupinus* Oliv., are also closely related if not identical, and McLachlan suggests that several of Walker's Indian species also belong to *C. plumbeus*.

Creagris mortifer (Walk.)

From Daressalam; Reitfontein, D. S. W. Afrika (at light), and Abyssinia. Probab y occurs over most of Africa.

Creagris ægyptiacus (Rambur).

From Egypt (Petersen coll.); Bagamoyo and Korogue, D. O. Afrika, also Madagascar. Also widely spread in Africa.

Peringuey has recently described four other species from South Africa. One, *C. angustipennis*, may belong to the genus, but the three other species (*C. damarinus*, *C. mashunus* and *C. bechuanus*) are said to have the spurs no longer than the first joint of tarsi; since all the species of *Creagris* known to me have spurs as long as three or four joints, I can hardly believe that these three species really belong to *Creagris*.

Formicaleon n. gen.

This genus, of the general appearance of *Myrmeleon*, is at once distinguished therefrom by having but one crossvein before the radial sector in the hindwings, and by the antennæ being close together at base; from the allied genera, *Nemoleon* and *Macronemurus*, it is separated by the longer spurs.

The genus *Formicaleo* Leach was made for *Myrmeleon formicarius*, which was already the type of *Myrmeleon*; therefore, I am compelled to make a new name for the *Formicaleo* that is used by Hagen and Brauer.

The type is *Myrmeleon tetragrammicus* Fabr.

There are many species in the African fauna, the few I have seen may be separated as follows:

1. Two broad black stripes on the yellow pronotum, and the lower sides black, antennæ long and slender, wings rather broad, most of the cross-veins brown 2
Not two broad black stripes on a yellow pronotum..... 3
2. Two cross-veins before radial sector in the hind-wings, stigma rosy. *idoneus*
But one cross-vein before radial sector in the hind-wings; stigma white.*lethalis*
3. Hind-wings with a dark streak in apical part; pronotum pale, with incomplete dark lines. *harpalyce*
No streak in the hind-wings..... 4
4. Four dark spots just behind the radius in each fore-wing..... *hesione*
No such spots..... 5
5. Hind part of fore-wings with many small dark spots; pronotum dark, with two darker stripes; antennæ short..... *lepidus*
Not so..... 6
6. Pronotum with a broad median black stripe, and oblique black line in apical part of the fore-wings..... *ilione*
Pronotum and wings not so marked..... 7
7. Gradates in fore-wings margined with brown; larger species, expanse 80 mm. *alcione*
Gradates of fore-wings not margined; smaller species, expanse about 50 mm. *persephone*

Formicaleon harpalyce n. sp.

Head yellow, a black mark under each antenna, a large interantennal mark, mostly above the antennæ, two bands across vertex made up of spots, a median spot behind and one each side on occiput; antennæ yellowish, tip darker, basal joint with dark mark below; pronotum broad, yellowish (or reddish), two black marks on front margin, a submedian pair of stripes behind, the posterior side margins broadly behind, and a spot each side on the transverse furrow black; rest of thorax pale, with black marks, mostly over base of wings, metascutellum with a pale median line; abdomen shorter than wings, dull black; legs pale reddish yellow, spurs curved, the first pair as long as four joints. Wings hyaline, venation pale, longitudinal veins not interrupted with dark, or very faintly so, some crossveins, especially costals partly dark, stigma yellowish (or reddish); hind wings with a long brown streak from the anastomosis of cubitus and median outward toward tip of wing. Wings slender, acute at tips, hind wings falcate at tip; about 8 crossveins before radial sector in forewings, 12 or 13 branches of radial sector in both pairs.

Expanse 70 to 80 mm.

From West Africa, Bismarcksburg, Togo.

Formicaleon alcione n. sp.

Face pale yellowish, black band below and above antennæ, a transverse frontal band on vertex, and spots more or less connected in a row behind; antennæ pale, annulate with brown, tip dark; pronotum broader than long, dark, three ill-defined pale stripes, the median more narrow; thorax pale, marked with dark, scutelli with a double dark spot; abdomen shorter than wings, blackish, pale each side near tip; legs pale, femora spotted with black, especially near the tip, tibia with bands above near base and tip, tips of tarsi black; the tarsi short, last joint nearly as long as other joints together, spurs as long as four joints. Wings hyaline, venation black and white, not dotted, but in long streaks, a spot at base of stigma, and two spots (smaller) beyond on the radius, the outer gradates very irregularly, but plainly dark, and a faint dark streak up from end of anal vein; hind wings with stigmal spot, and two beyond dark, also one on the anastomosis of cubitus and median. Wings very long and slender, acute at tips, hind wings falcate at tip, 7 or 8 crossveins before radial sector in forewings, 14 or 15 branches of radial sector in both pairs.

Expanse 75 mm.

From Mohorovi, D. O. Afrika, and one marked "Key. Frustorpher."

Formicaleon idoneus n. sp.

Face pale, a large black interantennal mark, reaching below the antennæ where it is deep and shining, paler above toward vertex, two rows of transverse spots on the vertex, the hind row with a projection each side behind; antennæ long, pale on base, and annulate with brown,

beyond and at tip darker brown; pronotum broader than long, yellowish, with two broad black stripes and the lower margins black; rest of thorax pale, striped and spotted with black, scutelli mostly pale, the mark over base of the forewings includes two pale spots; abdomen shorter than wings, brownish, paler on basal half and there with lateral black line; legs pale, anterior femora and tibiae dotted with black, tip of tarsi black, apical joint of tarsus nearly as long as others together, spurs about as long as four joints. Wings hyaline, stigma rosy, longitudinal veins black and white, radial sector and branches and most of the crossveins black. Wings rather broad beyond middle, tips acute, hind wings subfalcate; 8 crossveins before radial sector in forewing, two in hindwing, 13 branches of radial sector in both wings.

Expanse 85 mm.

From Langenburg, D. O. Afrika. In general similar to *F. lethalis*, having broad wings and slender antennae, but the two crossveins before radial sector in hindwing distinguish it.

Formicaleon ilione n. sp.

Face pale, a vertical black line between bases of antennae; a broad deep black band above antennae; two, rather curved, bands on the vertex, connected in middle by dark, and the posterior one extended behind in middle; pronotum with a broad black median stripe, broken up behind into lateral projections, a spot each side near front on the transverse groove, and the posterior sides black; rest of thorax mostly black, with a broad pale stripe each side, sides of scutelli pale; abdomen black, each segment (beyond the basal) with a pale stripe each side, connected in front of the dorsum, venter rather pale, the pleurae of thorax heavily streaked with black, leg short, hairy; femora thick, with many white hairs and bristles and a few black ones, anterior femora mostly black, others paler, especially below, front and middle tibiae with two black bands, hardly visible in hind tibiae, tarsal joints tipped with black, very short, the basal especially so, the fifth as long as all others together, spurs longer than three joints. Wings with the longitudinal veins heavily marked with black and white, the costals and many crossveins mostly black, black spot at base of stigma, a long curved prominent black stripe over the gradates toward tip of wing, and a short, oblique mark upward from near the end of the anal vein; hindwings less marked, the anal vein wholly, and the median vein on the basal third very pale yellowish, other veins marked slightly with black. Wings not very long, quite broad at stigma, hind pair much narrower, both pairs acute and subfalcate at tip, the outer margin being slightly concave, seven crossveins before origin of the radial sector in the forewings, ten to eleven branches of the radial sector in each wing.

Expanse 60 to 65 mm.

From Harrar, Abyssinia (Kristensen collector), types in collections Banks and Petersen.

Formicaleon persephone n. sp.

Face pale yellow, a black band below antennæ and one above, two transverse rows of spots on the vertex; antennæ pale, annulate with brown; pronotum broader than long, dull blackish, a faint median pale line and an indistinct outer pale stripe each side; rest of thorax dark, marked a little with pale, posterior margin of anterior lobe of mesothorax pale; abdomen blackish, a pale spot above before middle of each segment; legs pale, hind femora and tibiæ with blackish dots, front femora darker, tibiæ with basal and apical dark mark, and tips of tarsi black; apical joint of tarsus not as long as the others together, spurs as long as four joints, curved. Wings extremely slender, fully six times as long as broad, acute at tips; venation mostly black, the radius mostly pale, the subcosta interrupted black and white, cubitus with longer streaks of black and white, cross-veins on large patches are pale, the gradates black, a black spot at base of stigma and over union of subcosta and radius; 7 crossveins before radial sector in forewings, about 11 branches of radial sector in each wing.

Expanse 50 mm.

From Thies, Senegal. Its small size and very narrow wings separate it from all others.

Formicaleon hesione n. sp.

Face pale, a black band below and one above antennæ, pale between, vertex brown, three double black spots behind in a transverse row, and in front of these are two others, submedian; antennæ pale, annulate with brown; pronotum broader than long, dark, a median pale line, and a large anterior spot each side, not clearly outlined, but reaching backward; rest of thorax dark, marked with pale, especially on the scutelli; legs short, pale, tibiæ marked with brown above near base and at tip, tips of tarsi dark, dark dots on hind femora, black hairs below on femora and tibiæ I, tarsi short, apical joint about as long as others together, spurs as long as four joints, curved; abdomen shorter than wings, blackish, a pale spot above before the middle of each segment, apical segment with a pale spot each side near tip. Wings hyaline, venation black and white, some large patches of white veins, costals black at each end, four spots behind radius, one before radial sector, one on origin of radial sector, one on first branch of radial sector, and one near stigma, the stigma with basal black mark, and a spot on radius beyond, a short oblique mark over end of anal vein, and the outer gradates plainly black, also a spot over the first crossvein between cubitus and cubital fork; in hind wings a spot at base of stigma, one just behind radius near by, and one on radius beyond stigma. Wings very slender, acute at tips, 7 cross veins before radial sector in forewings, about 10 branches of radial sector in both pairs.

Expanse 58 mm.

From Nssanakang, Kamerun. In general appearance it is very much like *Nemoleon 4-maculatus* from East Africa, but the gradates are more plainly marked, and the tarsi are very different in structure.

Formicaleon lethalis (Walker.)

Specimens from Bagamoyo, Madagascar, Natal, and Mhonta, D. O. Afrika. Recorded from various places in East Africa. The *F. leucospilos* Hagen is the same species.

Formicaleon lepidus (Kolbe).

From Langenburg, D. O. Afrika, and Erythraea, (Petersen coll.).

Nemoleon Navas.

This genus has but one crossvein before the radial sector in the hindwings; the antennæ are not their diameter apart at base; the first joint of tarsus is about as long as the last joint, and the spurs about as long as this first tarsal joint. The wings are slender, with a single costal series.

Type—*Myrmeleon arenarius*.

- | | |
|--|------------------------|
| 1. Wings with some dark spots | 3 |
| Wings without dark spots | 2 |
| 2. Spurs and claws black | kituanus |
| Spurs and claws reddish | filiiformis |
| 3. Outer gradates in fore-wings form a prominent oblique dark stripe | pardalice |
| Outer gradates do not form a prominent stripe | 4 |
| 4. Four black spots just behind the radius in the fore-wings, and one at the stigma | quadrimaculatus |
| A black dot at end of anal vein in fore-wings, and one near end of median where it joins the cubitus | alcidice |

Nemoleon alcidice n. sp.

Face pale, a dark brown band over base of antennæ, and two narrow brown bands on the vertex, made up of conjoined spots; antennæ pale, the second joint dark above, the tip also dark; pronotum pale, a brown spot on each side margin; and two black dots on each side, one on the transverse groove, the other behind it on the hind margin; rest of thorax dark on sides, but only faintly marked in the middle, not plainly on the scutelli; abdomen dull black, last segment slightly paler at tip, all white haired. Legs slender, pale, distinctly dotted with black on the femora and tibiæ, and at tips of tarsal joints, claws long, reddish, as also the spurs, which are as long as the first tarsal joint, and this as long as the next three together, apical joint nearly as long as the basal, both black and white bristles on the legs. Wings hyaline; venation pale, interrupted with black, fore-wings with an oblique black mark near end of anal vein, a roundish, black spot near end of median at its connection with the cubitus, one black spot on the union of subcostal and radius, and two beyond on the radius, the outer one the larger; the anal vein pale, but its branches marked with black on the margin. Wings long and slender, acute at tips; seven crossveins before the radial sector in forewing, nine branches of the radial sector in each wing. Hindwings mostly unmarked.

Expanse 58 mm.

From Erythraea (Kristensen coll.). Type in coll. Petersen; (cotype in Banks coll.); a poor specimen from Duma, Kamerun, June (Berlin Museum).

Nemoleon pardalice n. sp.

Face pale, a dark band under and between antennæ, two narrow bands on the vertex, made up of black spots, and behind a pair of submedian marks; antennæ brown, except the pale base; pronotum dark, with a pale spot each side in front, and a pale streak behind; thorax dark, a pale spot each side on the anterior lobes, and on scutelli, posterior margin of the anterior lobe and of the mesothorax pale, two pale marks on the metanotum; femora mostly dark, but white-haired, tibiæ with basal and preapical dark bands, and tips of tarsal joints dark; spurs not as long as the basal joint, which is about as long as the next two together, apical a little longer than the basal. Abdomen black, white-haired, tip pale. Wings hardly hyaline; venation mostly dark, the subcosta, radius, and cubitus, marked with white, some crossveins white, and some white on branches of the radial sector, median vein wholly black; many veins bordered with black, especially the crossveins in hind part of wings, also the outer gradates, which form a long oblique line, and the veinlets obliquely above the end of the anal vein, the origin of the radial sector, an oblique vein before it, one oblique vein connecting it to the radius, and where it bends up toward the radius near the stigma, also black; the stigma dark; some small cross-veins beyond the stigma in the costal area are bordered with black; in the hindwings the subcosta black and white, the other veins mostly black, the forks of veinlets near the outer hind margin are dark, and also above the radius near tip of wing with dark spots on the forks. Wings rather short, and broad; forewings hardly acute at tips, hindwings plainly so; six crossveins before origin of radial sector in the forewing, one of them oblique, about eight branches of radial sector in both pairs, all costals simple. Abdomen much shorter than wings; vertex high and convex in a ridge, pronotum about as long as broad.

Expanse 40 mm.

From Erythræa (coll. Kristensen), type in collection Petersen.

Nemoleon 4-maculatus n. sp.

Head pale, a black mark each side under antennæ along the side of the eyes, a black band above antennæ, emarginate above in middle, two rows of black spots on vertex, six in each row, more or less connected in pairs; antennæ pale, annulate with brown; pronotum slender, narrowed in front, dull black, a median pale stripe from before middle to tip, and a stripe each side pale; rest of thorax dull black, with a few yellowish spots; abdomen about as long as wings, black, with white hair, tips of segments with a yellow spot above; legs pale, marked with black, long black bristles and white hairs, tips of tibiæ and tarsi black, femora with black near middle, at least above; basal joint of tarsus as long as last, spurs a little longer than first joint. Wings hyaline, marked with black, venation black and white, forewings with four black spots behind radius, one before origin of radial sector, one on origin of radial sector, one a little beyond first branch of radial sector, and one near the

stigma; base of stigma black, a narrow streak up from end of anal vein, spot at anastomosis of cubitus and median, and two dots on radius beyond stigma; many crossveins are black, but there are large patches where all are white, two of these near middle of wing and one oblique below the stigma; hind wings with spot at base of stigma, and a spot behind radius black, some of the same large patches of white crossveins as in the forewings. Wings very slender, acute at tips, 7 crossveins before radial sector in forewings, about 9 or 10 branches of radial sector in both pairs.

Expanse 58 mm.

One from Langenburg, Nyassa-See, and one from Zanzibar.

Nemoleon filiformis (Gerst.).

From Bismarckburg, Togo, and Nssanakand, Kamerun.

Nemoleon kituanus (Kolbe).

From Peleki, Kwidjwi, D. O. Afrika.

Macronemurus Costa.

This genus is similar to *Formicaleon*, but the spurs are shorter. The antennæ are close together at base; the pronotum is very narrow when compared with the head; and the antennæ are rather long and slender. There are two types of venation; one in which the forks of cubitus are much divergent, and the wings are broader, and the radial sector arises barely beyond the forking of cubitus. This is the typical section. The other group has narrower wings, the radial sector arises much beyond the forking of cubitus, and the cubital forks are nearly parallel approaching the condition of *Creagris*; the species *M. iolanthe*, and *M. melanthe* described below belong to this section.

Type of genus—*M. appendiculatus* Costa.

The species here recorded may be separated by the following table:

- | | |
|---|-------------------|
| 1. Hind-wings with an apical brown streak; cross-veins all dark; pronotum with dark stripes | <i>striola</i> |
| Hind-wings with the outer apical margin dark; a dot at end of anal and on anastomosis of eubitus and median in the fore-wings. | <i>iolanthe</i> |
| Hind wings without streak or dark margin. | 2 |
| 2. Fore-wings with many large black spots (about 24) and four or five near apex of the hind-wings. | <i>pulchellus</i> |
| Wings without large marks. | 3 |
| 3. Radius and subcosta unmarked; cross-veins nearly all pale; no spots on wings; pronotum mostly dark. | <i>melanthe</i> |
| Radius and subcosta black and pale alternately. | 4 |
| 4. Pronotum pale, with three entire, black stripes; gradate veinlets marked; many cross-veins are margined with brown at their junction with the longitudinal veins. | <i>loranthe</i> |
| Pronotum not so marked. | 5 |

5. All the cross-veins are margined with brown; pronotum pale, with lateral dark stripe, and three dark spots in the middle *ianthe*
All cross-veins not margined with brown 6
6. A median forked stripe on pronotum; cross-veins nearly all dark; stigma white *tinctus*
No median forked stripe on the pronotum 7
7. Pronotum yellow, with two spots at front margin and a median one behind, and a narrow stripe each side dark; nearly all cross-veins dark .. *euanthe*
Pronotum mostly dark 8
8. Pronotum dark with a narrow, pale, median line. *chloranthe*
Not so marked 9
9. A black dot at end of anal vein, and one at base of stigma; pronotum all dark (a broken specimen seen) sp.
No dots on wings; pronotum marked with pale, (a broken specimen seen) .. sp.

Macronemurus striola Kolbe.

From Bagamoyo, and Lindi, D. O. Afrika; the former specimen is small, and slightly marked, but does not seem to differ in structure.

Macronemurus tinctus Kolbe.

From Peleki and Netron See, D. O. Afrika, and Kiiui, East Africa.

Macronemurus chloranthe n. sp.

Face yellow, a black band below and a broader one above antennæ, two rows of dots on the vertex, the hind one curved; antennæ slender, broadly annulate with brown; pronotum fully as long as broad, sides subparallel, dark, a narrow, median pale line, and a pale sinuate stripe each side, a black dot each side on the transverse furrow, thorax dark, black on middle of metanotum, and some faint pale marks in front; abdomen blackish, a pale yellowish streak each side above on middle of each segment, shorter than wings; legs pale, femora darker near tip, tibiæ with subbasal and apical marks brown, joints 2, 3, 4, and apical part of 5 black, legs white-haired, a few black bristles, apical joint of tarsus much longer than broad, spurs fully as long as two joints. Wings hyaline, venation black and white, usually in long streaks, especially prominent on subcosta, radius, and cubitus, a dark spot at base of stigma, and the crossvein below it black, outer gradates dark and spot at end of anal vein; in hind wings with spot at stigma; wings slender, acute at tips, 7 crossveins before radial sector in forewings, 8 branches to radial sector in both pairs.

Expanse 46 mm.

From Okahanda, S. W. Afrika.

Macronemurus iolanthe n. sp.

Face yellow, interantennal mark and the vertex all black; antennæ long, brown, tip darker; pronotum a little longer than broad, narrowed in front, dull blackish, with faint median pale line, and a broader pale mark on each side, indistinct in some lights; thorax and abdomen black, latter with white hairs, apical segment pale; abdomen of female shorter than wings; legs with mostly black femora, anterior pairs paler in front,

tibiæ I and II blackish above, tarsi long, but apical joint much longer than basal, spurs about as long as two joints. Wings hyaline, outer margin near tip fumose, more prominent in hind wings, a spot on fork of cubitus, one below stigma, two on radius beyond stigma, one at anastomosis of cubitus and median, and an oblique one at end of anal vein, black, some small dots along anal vein beyond its middle; hind wings unmarked, venation mostly pale, the subcosta, radius, and cubitus faintly dotted with dark. Wings long and slender, acute at tips, 7 crossveins before radial sector, 10 or 11 branches of radial sector in both pairs; the anal (in forewings) runs parallel to cubital fork for some distance, six or seven cross-veins between them.

Expanse 64 mm.

From Bismarckburg, Togo.

Macronemurus melanthe n. sp.

Face yellowish, interantennal mark and vertex entirely black; antennæ brown, darker at tips; pronotum a little broader than long, dull yellowish brown, with indistinct dark marks, a pair in front, a pair behind, and the outer posterior edges black; thorax mostly black; abdomen blackish; legs pale, femora and tibiæ dotted with red brown, tarsi long and slender, last joint as long as the first three joints, spurs only a little longer than basal joint. Wings hyaline, venation pale, almost unmarked, stigma not distinct. Wings long and slender, acute at tips, 6 crossveins before radial sector in forewings, 11 branches of radial sector in both pairs; in forewings the anal vein runs parallel to the cubital fork farther than in other species (except *iolanthe*), there being five to seven crossveins between them. Male abdomen is longer than the wings, the appendages rather long, but not one-half as long as the penultimate joint.

Expanse 58 mm.

From Bismarckburg, Togo.

Macronemurus euanthe n. sp.

Head yellow, a black band above and below antennæ, a narrow transverse line across front of vertex, and a curved row of six small dark spots behind, behind this a median spot; antennæ rather long, pale, faintly annulate with brown, pronotum not much broader than long, pale yellowish, two submedian spots on front margin, a median spot behind, and a stripe each side, brown, the latter not reaching front margin; thorax yellow, spotted with dark, anterior lobe with two spots and the anterior margin dark, scutelli with median dark stripe, and dark streak over base of wings; abdomen shorter than wings, dark, pale on base, white-haired; legs pale, some dots on the hind femora, a sub-basal and apical mark above on tibiæ I and II, and tip of tarsus dark, long erect bristles on femora and tibiæ, last joint of tarsus nearly as long as the others together, spurs as long as three joints (leg I) or two joints (leg III). Wings hyaline, nearly all crossveins dark, and margined with pale brown, longitudinal veins pale, the radius and cubitus with dark dots; in hind wings the crossveins not margined, but some dark dots

near apical margin. Wings rather slender, forewings acute at tips, hind wings subfalcate; 7 crossveins before radial sector in forewings, 9 branches of radial sector in both pairs. Male abdomen longer than wings very slender, appendages filiform, about as long as the penultimate joint.

Expanse 45 mm.

From Reitfontein, D. S. W. Afrika, (at light).

Macronemurus ianthe n. sp.

Very similar to *M. euanthe*, the same spotting of pronotum and thorax; the head has the interantennal mark reaching farther up on the vertex so there is no line across the vertex and in place of the row of spots is an anchor shaped mark, and a dot each side adjoining the eye; abdomen yellowish brown, white-haired; legs as in *M. euanthe*, the spurs hardly longer than two joints; wings as in *M. euanthe*, but all cross-veins are more heavily bordered with brown, the subcosta, radius, and cubitus are prominently white and black; in hind wings many crossveins, especially in the posterior part of wings, are margined with brown, the subcosta, radius, and cubitus white and brown; stigma yellowish. Wings slender acute at tips, 7 crossveins before radial sector in forewings, 10 branches of radial sector in both pairs.

Expanse 56 mm.

From Langenburg, D. O. Afrika.

Macronemurus loranthe n. sp.

Head yellow, a large black interantennal mark extending below antennæ and much above, and on middle above it is connected to a median dark stripe which extends to the back of head, a brown spot each side on vertex; antennæ brown; pronotum much broader than long, yellow, a broad median and a lateral stripe each side dark brown, each continued back on the mesothorax, the lateral ones furcate behind; a median stripe on metanotum, and a furcate mark over base of wings; pleura with a broad interrupted brown streak. Abdomen slender, in male longer than wings, and with appendages nearly as long as last segment, pale brown, a faint pale mark each side near base of segments, sometimes in form of a streak. Legs pale yellow, the tibiæ with basal and apical dark spot above, tip of tarsus dark, and dark dots on femur, last tarsal joint nearly as long as the others together, the spurs nearly as long as three joints. Wings hyaline, venation pale, marked with brown at connection of all veins, thus making many small dots all over the wing, more prominent along cubitus and on outer gradates, stigma pale, no basal spot; hind wing with these small spots along the hind and apical margins; the subcosta and radius interrupted with brown. Wings rather broad at stigma, acute at tips, hind wings sub-falcate at tip; 5 to 7 crossveins before radial sector in forewing, 12 branches to radial sector in both pairs, in forewings a few of the costals before stigma are forked.

Expanse 50 to 57 mm.

From Bismarckburg, Togo, and the Togo Hinterland.

Macronemurus pulchellus n. sp.

Face pale, a black dot between antennæ, a dark band above antennæ, and a spot each side on posterior part of vertex; antennæ pale brownish; pronotum yellowish, unmarked, except a black dot each side on hind margin and a black mark in posterior corners; the outer part of pronotum before the groove is rather darker than the middle; rest of thorax pale yellow, black on sides, and across the anterior lobe, two spots on the metathorax black, scutelli wholly pale; abdomen black, segments broadly pale behind, tip and most of the second segment pale; legs long and slender, hind femora deep-black, tibia lined near the tip below, anterior femora with an outer black line, spurs as long as two tarsal joints, the basal joint very short, the apical nearly as long as all others together. Wings hyaline; forewings heavily maculate with many quite large black marks, and some near the apex of the hindwings; costal area of forewings unmarked, about 24 spots over rest of surface, mostly over a crossvein, and roundish or elongate in shape; the elongate ones mostly near and at right angles to the hind margin; hind-wings with four or five such spots near the apex and toward hind margin; venation mostly pale; stigma not very dark. Wings rather slender, acute at tip; forewing with about five crossveins before radial sector, nine branches to radial sector in each wing; abdomen shorter than wings.

Expanse 65 mm.

From *Erythræa* (Kristensen coll.); type in coll. Petersen.

Cymothales Gerst.

The radial sector of hind wings arises near base, with but one crossvein before it; the wings are rather broad in the stigmal region, and more or less falcate at tip, the hind pair usually strongly falcate; the cubitus in hind wings is scarcely forked, or the fork so weak as not differing from the other veinlets from cubitus to the margin; the anal also weak. The antennæ are very slender, and rather wide apart at base; the legs are extremely slender, the basal tarsal joint longer than the apical; spurs as long as two joints; the tibiæ longer than the femora; the prothorax is long and slender.

Type—*C. mirabilis* Gerst.

The species can be separated by this table:

- | | | |
|----|---|--------------------|
| 1. | Middle band of fore-wings plainly divided into two spots..... | 2 |
| | Middle band of fore-wings undivided, at least one connection..... | 4 |
| 2. | This band only narrowly divided; the apical mark of fore-wings is very broad, and hardly at all broken up by pale spots..... | <i>liberiensis</i> |
| 3. | This band is broadly divided; the apical mark broken up by pale spots.... | 3 |
| | Femur I black, and black-haired; antennæ mostly pale; a spot on fore-wings before the stigma, and one near middle of hind margin of each wing.... | <i>speciosus</i> |
| | Femur I not black-haired; and only with a few pale dots..... | <i>eccentros</i> |

- | | |
|---|------------------|
| 4. Thorax black, with narrow pale lines..... | 5 |
| Thorax pale, with a median black stripe over meso and metathorax; the spot on hind margin of hind wings is connected along the margin to the apical spot..... | delicatus |
| 5. Antennæ pale, except basal joint and the tip..... | dulcis |
| Antennæ dark for one-third way out..... | 6 |
| 6. Continental specimens..... | mirabilis |
| Madagascar specimens..... | bouvieri |

Cymothales liberiensis Weele.

From Longji and Victoria, Kamerun; I have one from Sierra Leone.

Cymothales mirabilis Gerst.

From Bismarckburg, Togo, and Abyssinia (Petersen coll.)
Known from several other localities in Africa.

Cymothales speciosus Gerst.

One from Amani, D. O. Afrika.

Cymothales sp.

A broken specimen from Kongo, appears to be a new species related to *C. delicatus*.

Cymothales delicatus n. sp.

Face pale, a curved brown mark on each side, a band below antennæ, above brown and on the front part of the elevated portion, vertex with six brown spots in a transverse row in front, and three larger spots in a row behind, each of the latter are nearly double; antennæ with dark mark on basal joint, and a dot each side on the second joint, beyond black for about five or six joints, and then white for three joints, then brown to the tip; pronotum pale with a median stripe brown, and a brown curved line each side in front; rest of thorax dark brown, with a white stripe each side; abdomen pale brown; legs pale, femora mostly brown, especially above, tibiæ with brown dots. Wings hyaline, venation mostly pale, but the veins in dark spots are dark; forewings with a basal spot, with an outer extension behind; a median spot from radius to the median vein nearly square, and narrowly connected to a brown V-mark behind it; a long brown stigmal mark, extending obliquely inward, not so well defined, to near the median vein; slightly behind it begins an oblique, brown streak which extends to the hind margin and in front points toward the tip of the wing; around the tip are several dark spots, but not very distinct, the whole apical area is slightly fumose; the costal area has several of the crossveins marked with brown. Hind wings with a basal brown spot over origin of the radial sector, one on a crossvein from radius to radial sector, about seven crossveins beyond the basal one, another toward the stigma, and one under stigma, the apical part above radius mostly dark, but a narrow apical pale streak, hind margin toward tip has two well separated brown spots, the outer one is connected by brown along the hind margin to the brown at tip, the

short veinlets along the hind margin are mostly dark. Wings broad; the forewings hardly falcate at tip; the hind pair but little longer than front wings, falcate at tip, but not as strongly so as in *C. mirabilis*; about four crossveins before the radial sector in the forewings, about eight branches to radial sector in each wing, the sixth branch is soon forked, otherwise venation much as in other species.

Expanse 68 mm.

From Kongo, West Africa, in coll. Banks.

***Echthromyrmex* McLach.**

(*Palparidius* Peringuey.)

Antennæ hardly diameter of basal joint apart, not very long; legs rather short, basal joint short, apical as long as others together, the spurs nearly as long as two joints, tibiæ shorter than femora; pronotum very short; male appendages extremely long. Wings rather broad; costals simple, one crossvein before radial sector in the hind wing, in forewings the first branch of radial sector arises barely before the cubital fork. In hind wing the cubital bends upward and then downward to the anastomosis with the median, the anal parallels it so that the cubital fork is indistinct.

Type—*E. platypterus* McLach.

I have not seen the type species, and the above description is taken from the species described below which I believe is congeneric; at least it agrees with McLachlan's description, and is remarkable in having, as he said, the "postcosta simple" (= cubitus); in this feature it is related to the South American genus *Dimares*, and the markings of the wings are also similar to that genus. The genus, *Palparidius*, recently described by Peringuey is the same, without doubt; it has no very close relation to *Palpares*.

***Echthromyrmex fascipennis* n. sp.**

Face yellowish; a transverse brown mark on face, a large brown interantennal mark slightly pointed below on the middle, and extending up in front of the vertex, which is bilobed; four pale brown marks on vertex in a curved row; antennæ dark brown; pronotum very short, nearly twice as broad behind as long, much narrowed in front, pale, with a median black stripe, and an oblique lateral one each side, many minute black points at base of bristles; rest of thorax black, a broad pale stripe over middle behind the anterior lobe, and including a median dark stripe; thorax at base of wings pale; abdomen dark, a pale median and a lower lateral stripe, all very narrow toward tip; appendages yellowish, blackish near base below; legs yellowish, rather short and heavy, not very hairy, basal tarsal joint barely longer than the second, apical as long as others together, spurs straight, nearly as long as two joints.

Wings hyaline, with large black marks; forewings with dots along the upper edge of the subcosta along both sides of the cubitus, to the fork, and along the lower branch of the fork; many dots near the posterior and outer margin; two oblique narrow black bands, both begin at the radius, one before the middle and one beyond the middle, this latter is broken near tip, and reaches in a line to the hind margin; an oblique apical streak black, and including several white crossveins, a dark mark before and one beyond the white stigma. Hind wings with some dots along the subcosta, a rather broad oblique dark band before the middle, beginning at the radius and with a curved tip, not reaching across wing; a large dark spot before the stigma, and behind it on the hind margin are two narrow upward streaks, the inner one forked, a short apical dark streak, and some dark dots along the outer margin; venation of both pairs mostly pale, except dark spots on the radial sector and cubitus. Wings rather broad, not very long, not acute at tips; three or four crossveins before radial sector in forewing, about nine branches to radial sector in each wing, the anal region of both pairs is very broad, in the hind wing the post-anal extends out quite a long distance, and has five branches to the margin. Abdomen shorter than the wings (in the male), the male appendages are extremely long, fully one-half as long as the abdomen, curved downward, and parallel.

Expanse 76 mm.

From Okahanda, Deutsch Sud-West Afrika, (Berlin Museum).

Peringuey has recently described* two species which are closely related to *E. fascipennis*. He made for them a new genus, *Palparidius*, but his figure shows it is the same as *Echthromyrmex*. His *P. capicola* has the stigmal mark of the hind wings entire, not broken up into three spots as in *E. fascipennis*; his *P. concinnus* has this stigmal mark broken up, but the median band is very narrow, and not hooked at end; there are several other differences in maculation. The male appendages of *E. fascipennis* appear to be much longer than in either of Peringuey's species.

EXPLANATION OF PLATES I AND II.

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|-----------------------------------|-------------------------------------|
| Fig. 1. Myrmeleon alcestris. | Fig. 13. Nemoleon pardalice. |
| Fig. 2. Macronemurus ianthe. | Fig. 14. Formicaleon ilione. |
| Fig. 3. Myrmeleon furcatus. | Fig. 15. Myrmeleon medialis. |
| Fig. 4. Gymnoleon exilis. | Fig. 16. Nesoleon boschimanus. |
| Fig. 5. Myrmeleon doralice. | Fig. 17. Nesoleon punctatissimus. |
| Fig. 6. Nemoleon alcidice. | Fig. 18. Creagris pretiosa. |
| Fig. 7. Myrmeleon obscurus. | Fig. 19. Macronemurus melanthe. |
| Fig. 8. Formicaleon harpalyce. | Fig. 20. Nemoleon quadrimaculatus. |
| Fig. 9. Macronemurus euanthe. | Fig. 21. Echthromyrmex fascipennis. |
| Fig. 10. Macronemurus chloranthe. | Fig. 22. Echthromyrmex fascipennis. |
| Fig. 11. Formicaleon ideonus. | Fig. 23. Macronemurus loranthe. |
| Fig. 12. Macronemurus loranthe. | |

* Annals South African Museum, V, p. 43, 1910.